

REMARKS/ARGUMENTS

Prior to entry of the present Amendment, claims 1-20 and 23-27 were pending, with claims 21-22 having previously been cancelled without prejudice. Claims 1, 20 and 26-27 have been amended. No new matter is added.

Examiner's Interview

Applicants appreciate the Examiners' time and consideration during the Interview held on April 8, 2009. During the Interview, Applicants' representative and Examiners Mok and Tamai discussed claims 20 and 25-26 and the teachings of the prior art, U.S. Patent Nos. 4,710,795 ("Nippert"); 6,697,257 (which issued from the U.S. national application corresponding to International (PCT) Publication No. WO 01/27997 ("Wolf")); and 5,213,748 ("Biswas"). As discussed in the Examiner's Interview Summary and as discussed below in more detail, Applicants' representative provided arguments as to why the cited prior art does not teach or suggest the subject matter of the claims. However, agreement was not reached on the claims.

Claim Rejections

The Examiner rejected claims 1, 3-4, 6, 12-16, 18-20 and 23-27 under 35 U.S.C. §103 as being obvious over Nippert in view of Wolf and Biswas. Also, the Examiner rejected claims 2 and 10 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent No. 6,060,795 ("Azotea"). In addition, the Examiner rejected claim 5 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent No. 6,274,955 ("Sato"). Further, the Examiner rejected claim 7 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent No. 5,697,811 ("Pickles"). Also, the Examiner rejected claim 8 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent Publication No. 2003/0080772 ("Giacomini"). In addition, the Examiner rejected claim 9 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent Publication No. 2003/0128080 ("Viswanathan"). Further, the Examiner rejected claim 11 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent No. 6,440,750 ("Feygenson"). Finally, the Examiner rejected claim 17 as being obvious over Nippert in view of Wolf and Biswas and further in view of U.S. Patent No. 6,327,332 ("Weber"). Reconsideration of the rejections is respectfully requested.

Independent Claim 1

Amended independent claim 1 defines an electric motor (10) for adjusting moving parts in a motor vehicle, comprising an electronic unit (70) with a sandwich construction, which contains a first electrically conductive substrate (71) and a second electric conductive substrate (72), between which power components (75) are located and electrically connected to both substrates (71, 72), and a side (84) of the second substrate (72) facing away from the first substrate (71) is equipped with additional electronic components (56), wherein the first substrate (71) is a punched grid (44) punched from a metal material, the punched grid (44) being directly electrically and mechanically connected to the power components (75), the punched grid (44) supporting the power components (75), the punched grid (44) together with the second substrate (72) is extrusion coated with and totally encapsulated by a plastic body (95) produced by injection molding in such a way that only extensions (97) of the punched grid (44) protrude from the plastic body (95), forming an electrical and/or mechanical interface (98) for connecting additional motor components (99, 38, 40, 104, 102, 80).

As discussed during the Interview, Nippert discloses a semi-conductor power module including substrates (base plate 2 and cover plate 3) which are metallized by direct bonding with copper or ceramic. The metallized surfaces are etched with the desired run structure. A plastic housing can be placed over the cover plate 3 and cemented to the non-metallized outer edge of the base plate 2. The housing may thereafter be filled with casting compound.

Nippert does not teach or suggest, among other things, an electric motor including an electronic unit containing a first substrate which is a punched grid punched from a metal material. Rather, Nippert discloses that the substrates (plates 2, 3) are metallized by direct bonding with copper and etched to provide the desired run structure. In Nippert, the metallized surfaces do not provide a substrate, as claimed, and do not support any power components. Instead, the plates 2, 3 support the power components.

Nippert also does not teach or suggest the plates 2, 3 being extrusion coated with and totally encapsulated by a plastic body produced by injection molding in such a way that only extensions of a punched grid protrude from the plastic body. Rather, Nippert discloses that a plastic housing can be placed over the cover plate 3 and cemented to the outer edge of the base

plate 2 and, thereafter, that the housing can be filled with casting compound. For at least these independent reasons, Nippert does not teach or suggest the subject matter of claim 1.

As discussed during the Interview, Wolf does not cure the deficiencies of Nippert. Wolf discloses a power semiconductor module including carrier substrates 1, 2, 3 which each include a metal plate 11, 12, 13 forming conductor tracks 31-36. To form the substrates, a thin metal layer is applied onto each insulating layer 21-24. In one embodiment (see Figs. 1*b* and 1*d*), an encompassing wall 70, for example, of metal foil, is secured to the substrates by gluing or soldering. In another embodiment (see Fig. 3*b*), an elastically resilient central layer 90 is provided, and the module is inserted into a cooling body 95 by compressing the layer 90. In another embodiment (see Fig. 4), a wall 100 of an injection molding composition 101 is applied to only the face ends 15-17 of the substrates 1, 2, 3. The outer substrates 1, 3 are cooled directly by a coolant.

Wolf does not teach or suggest, among other things, an electric motor including an electronic unit containing a first substrate which is a punched grid punched from a metal material. Rather, Wolf discloses that each substrate 1, 2, 3 includes a metal plate 11, 12, 13 and that, to form the substrates, a thin metal layer is applied to an insulating layer. In Wolf, the thin metal layer does not provide a substrate, as claimed, and do not support any power components. Instead, the substrates are provided by the thin metal layer applied to the insulating layer.

Wolf also does not teach or suggest the substrates 1, 2, 3 being extrusion coated with and totally encapsulated by a plastic body. Rather, Wolf discloses that, at most, only the face ends 15-17 of the substrates 1, 2, 3 are covered by a wall 100 of injection molding compound 101 and that the outer substrates 1, 3 are cooled directly by a coolant. Applicants respectfully submit that this direct cooling of the outer substrates 1, 3 could not be provided if the outer substrates 1, 3 were encapsulated in the injection molding compound 101, as claimed. For at least these independent reasons, Wolf also does not teach or suggest the subject matter of claim 1.

As also discussed during the Interview, Biswas does not cure the deficiencies of Nippert and Wolf. Biswas discloses a method of molding a thermoplastic ring onto a lead frame 30. The lead frame 30 may be punched to provide leads 32, and a plastic member is formed to encapsulate the center portion 44 of the leads 32. As shown in Fig. 4, a silicon device is supported on a ceramic member, and the inner end 42 of each lead 32 is connected through

conductive paths and wire bonds to the silicon device. A cover and a heat spreader enclose the assembly.

Biswas does not teach or suggest, among other things, an electric motor including an electronic unit containing a first substrate which is a punched grid punched from a metal material. Rather, Biswas discloses only the lead frame 30 is punched metal, and the lead frame 30 does not provide a substrate, as claimed. Instead, in Biswas, a ceramic member with conductive paths and supports a silicon member. Biswas also does not teach or suggest the electronics module in a sandwich construction including a first substrate and a second substrate. At most, Biswas discloses a single ceramic member as a substrate.

In addition, Biswas does not teach or suggest the punched lead frame (as a substrate) together with the ceramic member being extrusion coated with and totally encapsulated by a plastic body being extrusion coated with and totally encapsulated by a plastic body. In Biswas, only the center portion 44 of the leads 32 are encapsulated with a plastic member; the assembly including the ceramic member is enclosed by the cover and the heat spreader. For at least these independent reasons, Biswas also does not teach or suggest the subject matter of claim 1.

Therefore, Nippert, Wolf and Biswas, alone or in combination, do not teach or suggest each and every limitation set forth in claim 1. Accordingly, independent claim 1 is allowable.

Dependent claims 2-19 and 23-27 depend from independent claim 1 and are allowable for at least the same and other independent reasons. In addition, the additional subject matter defined by the dependent claims, for example, by dependent claims 26-27, provide separate bases for allowance.

Amended dependent claim 26 specifies that plastic molding compound of the plastic body totally encapsulates the punched grid, the second substrate, the power components, and the electronic components. In Nippert, at least the outer side of the base plate 2 is not covered by any casting compound. In Wolf, at least the outer substrates 1, 3 are not covered by injection molding compound 101 but are cooled directly by a coolant. Biswas does not teach or suggest the claimed elements totally encapsulated and covered in a plastic body. Accordingly, Applicants respectfully submit that the cited prior art does not teach or suggest the additional subject matter defined by dependent claim 26.

Amended dependent claim 27 specifies that, before encapsulation, the side of the second substrate provides an outer surface and a side of the punched grid facing away from the second

substrate provides an opposite outer surface, and that plastic molding compound of the plastic body covers the side of the second substrate and the side of the punched grid facing away from the second substrate. In Nippert, the outer side of the base plate 2 is not covered by any casting compound. In Wolf, the outer substrates 1, 3 are not covered by injection molding compound 101 but are cooled directly by a coolant. Biswas does not teach or suggest the claimed elements encapsulated and covered in plastic molding compound. Accordingly, Applicants respectfully submit that the cited prior art does not teach or suggest the additional subject matter defined by dependent claim 27.

Independent Claim 20

Amended independent claim 20 defines an electronic module (70) in a sandwich construction, comprising a first electrically conductive substrate (71) and a second electric conductive substrate (72), between which power components (75) are located and electrically connected to both substrates (71, 72), and a side (84) of the second substrate (72) facing away from the first substrate (71) is equipped with additional electronic components (56), wherein the first substrate (71) is a punched grid (44) punched from a metal material, the punched grid (44) being directly electrically and mechanically connected to the power components (75), the punched grid (44) supporting the power components (75), the punched grid (44) together with the second substrate (72) is extrusion coated with and totally encapsulated by a plastic body (95) produced by injection molding, in such a way that only extensions (97) of the punched grid (44) protrude from the plastic body (95), forming an electrical and/or mechanical interface (98) for connecting additional motor components (99, 38, 40, 104, 102, 80).

As discussed during the Interview, Nippert does not teach or suggest, among other things, an electronic module including a first substrate which is a punched grid punched from a metal material. Rather, Nippert discloses that the substrates (plates 2, 3) are metallized by direct bonding with copper and etched to provide the desired run structure. Rather, Nippert discloses that the substrates (plates 2, 3) are metallized by direct bonding with copper and etched to provide the desired run structure. In Nippert, the metallized surfaces do not provide a substrate, as claimed, and do not support any power components. Instead, the plates 2, 3 support the power components.

Nippert also does not teach or suggest the plates 2, 3 being extrusion coated with and totally encapsulated by a plastic body produced by injection molding in such a way that only extensions of a punched grid protrude from the plastic body. Rather, Nippert discloses that a plastic housing can be placed over the cover plate 3 and cemented to the outer edge of the base plate 2 and, thereafter, that the housing can be filled with casting compound. For at least these independent reasons, Nippert does not teach or suggest the subject matter of claim 20.

As discussed during the Interview, Wolf does not cure the deficiencies of Nippert. Wolf does not teach or suggest, among other things, an electronic module including a first substrate which is a punched grid punched from a metal material. Rather, Wolf discloses that each substrate 1, 2, 3 includes a metal plate 11, 12, 13 and that, to form the substrates, a thin metal layer is applied to an insulating layer. In Wolf, the thin metal layer does not provide a substrate, as claimed, and do not support any power components. Instead, the substrates are provided by the thin metal layer applied to the insulating layer.

Wolf also does not teach or suggest the substrates 1, 2, 3 being extrusion coated with and totally encapsulated by a plastic body. Rather, Wolf discloses that, at most, only the face ends 15-17 of the substrates 1, 2, 3 are covered by a wall 100 of injection molding compound 101 and that the outer substrates 1, 3 are cooled directly by a coolant. Applicants respectfully submit that this direct cooling of the outer substrates 1, 3 could not be provided if the outer substrates 1, 3 were encapsulated in the injection molding compound 101, as claimed. For at least these independent reasons, Wolf also does not teach or suggest the subject matter of claim 20.

As also discussed during the Interview, Biswas does not cure the deficiencies of Nippert and Wolf. Biswas does not teach or suggest, among other things, an electronic module including a first substrate which is a punched grid punched from a metal material. Rather, Biswas discloses only the lead frame 30 is punched metal, and the lead frame 30 does not provide a substrate, as claimed. Instead, in Biswas, a ceramic member with conductive paths and supports a silicon member. Biswas also does not teach or suggest the electronics module in a sandwich construction including a first substrate and a second substrate. At most, Biswas discloses a single ceramic member as a substrate.

In addition, Biswas does not teach or suggest the punched lead frame (as a substrate) together with the ceramic member being extrusion coated with and totally encapsulated by a plastic body being extrusion coated with and totally encapsulated by a plastic body. In Biswas,

only the center portion 44 of the leads 32 are encapsulated with a plastic member; the assembly including the ceramic member is enclosed by the cover and the heat spreader. For at least these independent reasons, Biswas also does not teach or suggest the subject matter of claim 20.

Therefore, Nippert, Wolf and Biswas, alone or in combination, do not teach or suggest each and every limitation set forth in claim 20. Accordingly, independent claim 20 is allowable.

CONCLUSION

In view of the foregoing, Applicants respectfully request entry of the present Amendment and allowance of claims 1-20 and 23-27.

If additional consultation will further prosecution, the undersigned is available during normal business hours at the below-identified telephone number.

Respectfully submitted,

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